"Prediction of water Resources in Marathwada Region using spatial data Analysis."

For Degree of Philosophy in Computer Science

Under faculty of Science & Technology

Synopsis

Submitting to

Swami Ramanand Teerth Marathwada University, Nanded

Submitted By

Sukeshna chandrakant Narwade

Research Scholar

Under Guidance of

Dr. Nayana. S. Ratnaparkhi

Assistant Professor

Dnyanopasak Shikshan Mandal’ s

Arts, Commerce and science College,Jintur - 431509

Abstract of proposed work:

Data mining is process of discovering potential useful and interesting pattern hidden in large data set. Spatial data mining is emerged as new era in research community. Mining in spatial data is different in many aspect compare to mining in classical data. Spatial data mining application includes but not limited to social networking, disaster management and weather prediction. Data mining is the search of large data sets to extract hidden and previously unknown patterns.

Spatial analysis is the process of manipulating spatial data to extract new information and meaning from the original data. Usually spatial analysis is carried out with a geographical Information System(GIS). Spatial analysis in GIS facilities decision making in many spheres from minor routine business issues to global disaster response. The geo-referencing technology not only recognize the coordinates but states the time which allows tracing changes.

The main goal of this research work is to apply geographic information system (GIS) and data mining techniques to get attribute data in a spatial and tabular form related to district wise availability of standing water resources in marathwada region. An analysis has been done on available spatial data and maps to get non spatial data / tabular data, which are in more easily understandable form. Data extracted district wise related to area and number of standing water resources according to their size of marathwada region. Study shows the number of area standing water reservoir in selected district. The area and standing water bodies of their districts of Marathwada region are extracted from geodatabase and digitized maps. This type of information is more useful because a common person also able to understand these tabular data and they can use this data .This research works explore that the number and area of standing water resources in marathwada region using data mining techniques such as classification, decision tree, Naive Bayes,algorithm, artificial neural network. Comparative analysis based on data mining techniques for spatial data to extract water resources from marathwada region has been carried out and achieved in this work.

Remote sensing data as a primary data can be used for this research work. Secondary data can be collected from journals, internets, visual images, GPS etc.

Introduction

Data mining techniques are the process of identifying data patterns and trends in order to get useful information in a huge data set so that you can judge or decide. There are many data mining techniques have been developing and using in a data mining projects including association, classification clustering, decision tree, prediction and neural network etc. Each techniques has its rules and methods which determines the kind of problem it solves.

Identification of water is very significant for various precise estimations and human life. To detecting and extraction of surface water area from satellite data had been introduced at many more image processing techniques in the current decades. In this research work a number of

digitized maps related to water resources were collected from different sources. After that data mining techniques are used to extract non spatial data in tabular form. Which are more Understandable to common person and farmer also. Some spatial data for analysis purpose. Relational properties of database SQL, ANN, GIS etc. Used for data mining analysis of data. In this research work standing water resources data in their area and number of all district of Marathwada region in Maharashtra. Data extract using some data mining techniques. Data mining also termed as knowledge discovery. Is the process of analysis of data from different perspectives and summerization into valuable or non trivial information. This information can be used for variety of purpose research.

The data can be analized from many different dimensions, categorized and summarized the relationship identified. Data mining is high level application technique used to present and analyze data for decision makers.

Remote sensing gather information of study object remotely. The EMR (electromagnetic radiation) emitted from the object is captured by the sensors and converted into the desired information. The EMR spectrum comprises specific wavelength interval of interest.

The incorporation of RS and GIS with data mining techniques in hydrological Modeling has been effectively used in recent times as an development of water resources sustainably. Using data mining technologies and techniques enables more opportunities use of data banks of aerial remote sensing. Applications of various data mining techniques for image analysis classification are reported recently on the literature.

Spatial data of water resources as they are more understandable and useful in better utilization of water resources in agriculture and gives the option to analyze data from different sources under the same platform.

In this research binary logistics regression, support vector machine algorithm and c tree interface are used. Data mining has become an essential methodology for computing informatics progress in data mining application.

Aim And Objectives of study:

- Study and analysis of different water resources from marathwada region.
- Apply geographic information system (GIS) and data mining techniques to get the attribute data in a spatial and tabular format of study area region.

- Apply data mining techniques for the comparison of spatial and non spatial data.
- Implementation of different data mining techniques algorithms.
- Perform comparative analysis of data mining techniques on spatial data.

Review of Literature:

1. According to Mousi perumal,bhuvaneswari velumani,Ananthi Sadhasivam and kalpana Ramaswamy spatial data mining technology has emerged as a new area for spatial data analysis. This provide brief overview bof GIS data formats,data

representation models,data sources data mining algorithmic approches SDM tools,issues and challenges.Spatial Data Mining Approches for GIS - A brief Review .

2. According to Manibhusan and akram ahmed spatial analysis of water resources data in selected districs of Bihar,the main main of this study is to apply GIS and data mining techniques to get the attributes data in spatial and tabular from related district wise availability of standing water resources in their aera. Data mining techniques provides user oriented access to new and hidden patterns in data from which knowledge is generated which can help with decision making in agriculture organization.The analysis focused on determining the level of accuracy when using satellite imagery in this type of region.
3. According to Abudullahi Sidow Osman, Data mining techniques:Review- data mining tools and techniques will predict future trends by making the business more proactive and better knowledge driven decision. Data mining comprises extracting useful rules or Intresting patterns from historical data. Data mining techniques guide to lead the business in a comprehensive and successful manner.
4. According to Suchitra M. S. she proved that Data mining and machine learning techniques help create a crop recommendation system for a specific Agro-Ecological Unit and predict suitable crops in ranking order for a given location with its soil nutrient status. The primary goal is to assist farmers in selecting crops for the farmer's next cultivation period. Given a region and its soil parameters as data, the model should prescribe the best crops for that particular region based on the given parameters.
5. According to Di Kaichang, LiD Deren And Li Deyi spatial data mining techniques are very helpful to improve the traditional bayes classification method and proposed Approches of the implementation of inductive learning bin spatial databases are feasible and effective.
6. According to Sambhaji Tamsekar stated in GIS Based Decision Support System for Crop Selection, tries to build an integrated crop selection prediction model using GIS and machine learning methods as a vital and complex process in farming is crop selection data set used for the study consists of soil health details of Farms and records of Crop cultivation, he compares the algorithm which can predict the crop using parameters present in the data set to build decision support system.
7. According to AmiravM. Idress mostafa Lamlom Ahmed Khaled, Amal Hassan Ali Talkha spatial data mining, spatial data Warehousing, and spatial OL AP analyzing spatial data is considered a complex task due to its detail as it related to locations with special representation such as longitudinal and latitude. Spatial data mining including all aspects such as the different type of data, different type of methods of analysis, different mining techniques and other related topics.
8. According B. Anil, he stated in An integrated approach for groundwater assessment of Sita Swarna river basin Karnataka India using RS and GIS applications that estimation of the amount of surface runoff using a GIS-based Curve Number as well as the hydrological soil group and antecedent moisture condition, To make use of RS/GIS technology and appropriate method/algorithm to estimate the surface runoff,

evapotranspiration and identify the potential groundwater prospect zones in an integrated approach.

9. Marshet Nigatu Gebeyehu* Jimma University, Ethiopia, says, y. Applications of different remote sensing techniques are important for crop monitoring, crop condition assessment and yield estimation for sustainability of agriculture and natural resources. The spectral information is the important aspect of remote sensing data for crop modeling and it is strongly related with canopy parameters which are the representative of crop health and crop growth stages. Remote sensing and GIS can also be used very effectively in land use / land cover analysis as well as damage assessment because of drought, floods and other extreme weather events. Information on meteorology and vegetation are the two major important inputs into agricultural.
10. Rida Al-Adamat, 2012 The researcher explained that groundwater is considered to be the major water resource for many areas and the only source of water in some areas in Jordan. Some of Jordan groundwater resources are presently exploited at maximum capacity and in some casesare exploited beyond there safe yield. One of the efficient ways to fight the deficit in groundwater resources is through re-charging the water tables naturally artificially. This research aimed to select the optimum sites for groundwater re-charge in the Azraq Oasis area/Jordan through the use of GIS techniques. The selection criteria were based on slope, drainage density, lineament density within the study area. The adopted selection technique wasthe Boolean techniques (Multiplication) within a Raster GIS

Methodology to be adopted:

Data collection:

a) primary data : satellite imagery.

b) secondary data: journal, internet, google Maps, google Earth.

The source of the primary data collected as a result of experimental process of research secondary data collected from above sources and then applying spatial data mining techniques on it. Various data and digitized maps related to available water resources of district of marathwada region have been collected from different organization and institutions. There are arranged in required format. After that spatial data mining techniques have been applied to extract data from maps in tabular form which is more understandable. SQL, GIS software , ANN have been used for data mining from maps. Data mining techniques also includes classification, Clustering, Association rules. Classification and prediction are two form of data analysis that can be used extract models describing important data classes or to future data trends. The different techniques for discovering knowledge are Bayesian networks, Artificial Neural network fuzzy logic, genetics algorithms.

- Classification:

In order to verify the feasibility and effectiveness of the data mining based on image classification, water resources uses classification and prediction algorithms follow two different learning approaches supervised and unsupervised.

- Artificial Neural Network (ANN) :

  A multi layer perceptron architecture called an ANN is used to train and classify input patterns to produce the required output used three layer network in ANN model.ANN provide more accurate data than other methods.

  - Association:

  Association is among the well known data mining techniques, it discovers patterns based on the relationship between variables .

  - Clustering:

  Clustering is one among the first techniques used in data mining. Clustering process involves an analysis of one or more attributes to identify data that are similar to each other in order to understand the difference and similarties between the data sets.

Scope and Significance of the Study

Spatial data mining technology has emerged as a new area of spatial data analysis. geographical information system stores data collected from satellite imagery. The data in varied formats in the form of geo-databases representing spatial features, with respect to latitude and longitudinal positions.Data mining techniques is used to predict possible future trends or to discover hidden patterns in the behavior of the data techniques such as Artificial Neural Networks, decision tree, classification, clustering, association rules algorithm are widely utilized by experts. research work the data can be collected from utilized by scientific personnel as well as farmers and that will be used in agriculture for better utilization of water resources to enhance agricultural productivity and income of farmers of Marathwada region district.

Identify water resources from study area region with the help of spatial data mining techniques.The focus of this research is to provide with an overview of GIS data source, data format, trends and data mining techniques in GIS.

Proposed work Plan/ Formulation and Structure of Study:

Year-wise Plan of work and targets to be achieved:

2021-2022:

- Collection of Research Papers
- Complete Course Work.
- Study of different methodologies.
- Participate Seminar/Conferences/Training Related Subject.

2022-2023:

- Manually structured will be created.

- Collection of Research Papers.
- Two or Three Research Papers published.

2023-2024:

- Study of ANN, genetics algorithms.
- Study data mining classification
- Two or Three Research Papers published.

2023-2024:

- Study spatial data mining techniques.
- Water resources region specify.
- Two or Three Research papers published.

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Research scholar

Narwade sukeshna Chandrakant

Research guide

Dr. N. S. Ratnparkhi

D. S. M college jintur dist parbhani